REMARKS

In view of both the amendments presented above and the following discussion, the Applicant submits that none of the claims now pending in the application are anticipated under the provisions of 35 U.S.C. § 102. Additionally, the Applicant submits that all of the claims now satisfy the requirements of 35 U.S.C. § 112. Thus, the Applicant believes that all of these claims are now in allowable form.

I. OBJECTION TO THE ABSTRACT

The Examiner objected to Applicant's use of the term "is disclosed" in the Abstract. Responsive to the Examiner, Applicant has removed the term "is disclosed" from the Abstract.

II. REJECTION OF CLAIMS 27-30 UNDER 35 USC §112

The Examiner rejected claims 27-30 under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner noted that there is insufficient antecedent basis for the limitations.

Responsive to the Examiner, Applicant has amended claims 27 and 29 to address the missing antecedent basis. As such, it is respectfully submitted that claims 27-30 fully satisfy the requirements of 35 USC § 112, second paragraph and are now in allowable form.

III. CLAIM 3 HAVING ALLOWABLE SUBJECT MATTER

Applicant acknowledges and expresses his appreciation for the indication in Paragraph 16 of the Office Action that claim 3 contains allowable subject matter, "if rewritten in independent form including all of the limitations of the base claim and any intervening claims".

Responsive to the Examiner, Applicant requests reconsideration of the Examiner's determination that claim 3 depends upon a rejected base claim for the reasons set forth below. It is respectfully submitted that Applicant's explanation

below, place claim 3 in condition for allowance. Thus, the Applicant believes that claim 3 is now in allowable form.

IV. ELECTION AND RESTRICTION

The Examiner noted that claims 4-26 are withdrawn from consideration. Applicant respectfully reserves the rights to file continuation application(s) to prosecution any of the withdrawn claims. Additionally, if and when a generic claim is ultimately deemed to be allowable in the present application, Applicant respectfully requests that any of the withdrawn claims that depend from such allowed generic claim be deemed allowable as well.

V. REJECTION OF CLAIMS 1-2 AND 27-30 UNDER 35 U.S.C. § 102

The Examiner rejected in Paragraph 15 of the Office Action claims 1-2, and 27-30 under 35 U.S.C. §102(e) as being anticipated by Howard (US Patent 5,751,859, issued May 12, 1998). The rejection is respectfully traversed.

Specifically, the Examiner alleged that "Howard, in figures 2 and 4-8, discloses the same apparatus and method for coding an input object mask as specified in claims 1-2 and 27-30 of the present invention". Applicant respectfully disagrees.

First, Howard teaches a hybrid arithmetic encoding method that includes pattern matching. Specifically, Howard states that "high compression of bilevel textual material is achieved through a soft pattern matching (SPM) method that combines the features of both the non-progressive JBIG encoder and the PM&S method". Howard then states that "pattern matching is used, not for directly substituting the matched character as in the PM&S methods, but to improve the context used by the coder in coding the pixels within the mark. High compression is achieved in a lossy mode whereby pixels are selectively reversed to their opposite value if and only if doing so reduces the code length without introducing any 'significant' changes to the image". (See Howard, Column 4, lines 12-33)

421 However, Howard fails to teach or suggest the novel concept of <u>decomposing an input object mask into a plurality of object mask layers and then coding a next</u>

higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. Specifically, Applicant's independent claims 1, 27 and 29 positively recite:

> 1. A method for coding an input object mask, where said input object mask has a plurality of regions, said method comprising the steps of:
> (a) assigning at least one symbol to each of the plurality of regions;
> (b) coding said assigned symbols of the input object mask;
> (c) decomposing said input object mask into a plurality of object mask layers;
> (d) coding a base object layer of said plurality of object mask layers; and
> (e) coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. (emphasis added)
>
> 27. A computer-readable medium having stored thereon a plurality of instructions, the plurality of instructions including instructions which, when executed by a processor, cause the processor to perform the steps of a method for coding an input object mask, where said input object mask has a plurality of regions, said method comprising the steps of:
> (a) assigning at least one symbol to each of the plurality of regions;
> (b) coding said assigned symbols of the input object mask;
> (c) decomposing said input object mask into a plurality of object mask layers;
> (d) coding a base object layer of said plurality of object mask layers; and
> (e) coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. (emphasis added)
>
> 29. An apparatus for coding an input object mask, where said input object mask has a plurality of regions, said apparatus comprising:
> means for assigning at least one symbol to each of the plurality of regions;
> a first means for coding said assigned symbols of the input object mask;
> means for decomposing said input object mask into a plurality of object mask layers;
> a second means for coding a base object layer of said plurality of object mask layers; and
> a third means for coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. (emphasis added)

Applicant's invention teaches a method and apparatus for increasing the efficiency of scalable shape coding by correlating the coding of the mask of the object between different scales. Specifically, in the present invention, a new generic spatially-scalable shape coding method is disclosed that is independent of the mask decomposition scheme. More specifically, with reference to Applicant's Fig. 10, a full-resolution image frame having at least one object is initially segmented into a plurality of blocks or regions. For the purpose of mask generation, each block is assigned a mode or symbol to indicate whether it is "opaque", "transparent" or "border". The modes for the entire mask are then encoded into the bitstream.

Next, the method decomposes the "top level" or full-resolution mask into a plurality of layers or mask levels using any shape or mask decomposition methods, e.g., any of the decomposition methods as discussed in Applicant's FIGs. 2-6. The lowest mask layer, i.e., "base mask layer", is then encoded into the bitstream.

Next, the method hierarchically and contextually encodes mask layers that are above the base mask layer by using information from an immediate lower mask layer. Namely, each layer above the base mask layer (or "enhancement mask layer") is encoded using information that is derived from a mask layer that is immediately below the present mask layer of interest. In this manner, a generic spatially-scalable shape encoding method is provided that is capable of handling different shape or mask decomposition methods, while maximizing coding efficiency of the encoder.

The present invention is further described in detail with reference to Applicant's FIGs. 7, 8, 9 and 11. FIG. 11 illustrates a flowchart of a detailed method 1100 for generic spatially scalable shape or mask encoding, that is independent of the shape decomposition method. In essence, Applicant's invention discloses and claims "shape encoding" and more particularly, a specific type of "hierarchical shape encoding".

In contrast, first, Howard is completely devoid of any disclosure as to shape encoding. Howard is disclosing a new arithmetic encoding method that includes

pattern matching and a pixel reverse scheme that selectively reverses a pixel to increase coding efficiency. Such arithmetic encoding method of the entire input image would not anticipate Applicant's shape encoding method that addresses shape encoding.

Second, the Howard reference is completely silent as to hierarchical decomposition. Applicant's invention addresses the criticality of scalability. As such, Applicant's invention specifically addresses and claims hierarchical decomposition of the "input object mask". Since Howard doesn't even address shape encoding, the Howard reference is completely devoid of any teaching as to the decomposition of such an "input object mask" into a plurality of layers.

Third, Applicant then teaches the novel approach of coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer. Since Howard doesn't even address shape encoding and the decomposition of an "input object mask", the Howard reference is completely devoid of any teaching as to how a particular layer of object mask is constructed using information from a lower object mask layer.

The Examiner's attention is directed to the fact that Howard's contextual coding is for coding a pixel of the current image. Specifically, Howard states that:

> "Figure 2 shows the template used as the context for the pixel marked 'P'. The ten numbered pixels are used as the context to determine the probability of the value of pixel P. Thus, in step 103, the context of the pixel being coded is determined and, based on its context, the probability of the value (black or white) of P is accessed in a look-up table (step 104). The QM-Coder is then used to code and transmit the value of pixel P (step 105) using the probability of the pixel's value together with the actual value of P. (emphasis added.) (See Howard, Column 2, line 61 to Column 3, line 3)".

Thus, Howard clearly discloses its contextual based method as nothing more that a particular type of arithmetic coding. There is absolutely no disclosure as to "hierarchical shape encoding" as disclosed and claimed by the Applicant.

Thus, the Applicant respectfully submits that Howard would not anticipate Applicant's invention. As such, Applicant respectfully submits that independent

claims 1, 27 and 29 are not anticipated by Howard and, as such, fully satisfy the requirements of U.S.C. § 102 and are patentable thereunder.

Furthermore, dependent claims 2-3, 28, and 30 depend directly or indirectly from claims 1, 27 and 29 and recite additional features therefor. Since Howard fails to teach or suggest claims 1, 27 and 29 of Applicant's invention, Applicant respectfully submits that dependent claims 2-3, 28, and 30 are not anticipated by the teachings of Howard and, as such, fully satisfy the requirements of U.S.C. § 102 and are patentable thereunder.

Conclusion

Thus, the Applicant submits that all of these claims now fully satisfy the requirements of 35 U.S.C. §102 and §112. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of an adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

7/27/01

Kin-Wah Tong, Attorney
Reg. No. 39,400
(732) 530-9404

Thomason, Moser & Patterson, LLP
Attorneys at Law
595 Shrewsbury Ave.
1st Floor
Shrewsbury, New Jersey 07702

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8(a)

I hereby certify that this correspondence is being deposited on 7/27/01 with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to the Assistant Commissioner of Patents, Box non-fee Amendment, Washington, D.C. 20231.

Signature

7/27/01
Date of signature

Appendix

IN THE SPECIFICATION

(Abstract, page 47)

A generic spatially-scalable shape encoding apparatus and method for handling different mask decomposition methods, while maximizing coding efficiency of the encoder[, is disclosed]. The present generic spatially-scalable shape encoding applies three encoding steps to maximize the coding efficiency of the encoder, i.e., mask mode encoding, base mask layer coding and enhancement mask layer coding.

IN THE CLAIMS

27. (Amended) A computer-readable medium having stored thereon a plurality of instructions, the plurality of instructions including instructions which, when executed by a processor, cause the processor to perform the steps <u>of a method for coding an input object mask, where said input object mask has a plurality of regions, said method</u> comprising <u>the steps</u> of:

(a) assigning at least one symbol to each of the plurality of regions;

(b) coding said assigned symbols of the input object mask;

(c) decomposing said input object mask into a plurality of object mask layers;

(d) coding a base object layer of said plurality of object mask layers; and

(e) coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer.

29. (Amended) An apparatus for coding an input object mask, where said input object mask has a plurality of regions, said <u>apparatus</u> [method] comprising [the steps of]:

means for assigning at least one symbol to each of the plurality of regions;

a first means for coding said assigned symbols of the input object mask;

means for decomposing said input object mask into a plurality of object mask layers;

a second means for coding a base object layer of said plurality of object mask layers; and

a third means for coding a next higher layer of said plurality of object mask layers in accordance with information from a lower object mask layer.